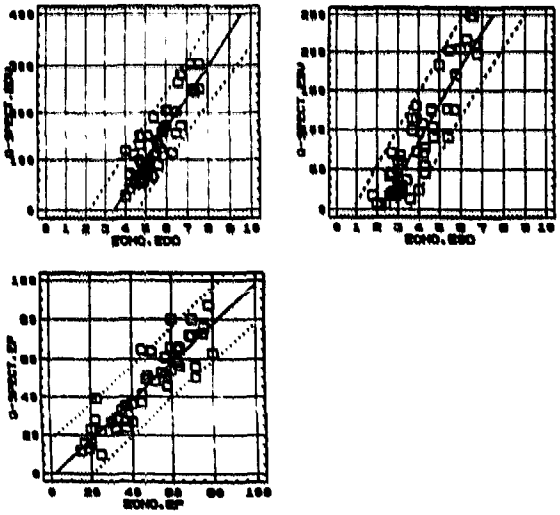
1023-145 Volumetric and Functional Analysis of Left Ventricle by Gated SPECT: A Comparison With Echocardiographic Measurements

D. Mathew, Y. Zabrodina, F. Manning. *Dept. Cardiology & Nuclear Medicine, Brigham & Womens Hospital, Harvard Medical School, Boston, Ma, USA*

Background: Gated SPECT has the potential of assessing myocardial perfusion, function, and left ventricular (LV) volumes - in one study. A completely automatic algorithm has been introduced for assessment of LV function and LV volumes. LV-EF as determined by gated SPECT has been validated by quantitative angiography and cine-MRI. In clinical practice ECHO is routinely used to assess LV size, which is a strong negative predictor of outcome in patient's with CAD. The purpose of this study was to compared LV volumes derived from gated SPECT with ECHO measurements of LV size and function.

Methods: 50 patient with ECHO and gated SPECT within 2 weeks were studied. LV end diastolic (EDD) and end systolic (ESD) dimensions were measured in the parasternal long axis view. Gated SPECT was performed using a rest-stress Tc-99m labeled Sestamibi or Myoview protocol with a 8 frame/cycle gating of the stress study. The tomographic data were reconstructed to short axis and long axis projections. An automatic edge detection algorithm defined the endocardial edge in all 8 frames in all short axis and long axis cuts.

Results:



There was good correlation between LV EDD (in ml), LV ESV (in ml), and LV-EF (%) by gated SPECT when compared with ECHO derived ED and ES dimensions (in cm) and LV-EF (%) ($r = 0.87$, $r = 0.90$, and $r = 0.90$ respectively, with SEE of 36.8, 30.5 and 8.9 respectively). The p values for the 3 comparisons were highly significant (all $p < 0.001$). When LV-EF was more than 65%, there was lesser agreement between the 2 modalities.

Conclusion: Gated SPECT provide reliable LV function and volume information in addition to assessing severity and extent of myocardial perfusion abnormalities. Thus additional information with important prognostic implications of great value in decision-making and management of patients with CAD is rendered – by *one* imaging study.

1023-146 Low Dose Dobutamine ECG Gated SPECT Myocardial Perfusion Imaging With Technetium 99-m Sestamibi Predicts Myocardial Viability: A Prospective Study

M.G. Levine, C.C. McGill, R.R. Azar, D.M. Cross, M.P. White, A.W. Ahlberg, D. Waters, G.V. Heller. *University of Connecticut, Hartford Hospital, Hartford, CT, USA*

To evaluate the role of low dose dobutamine infusion (LDD) during the count acquisition using resting Technetium-99m sestamibi ECG gated SPECT imaging (GSI) in the prediction of myocardial viability, 12 patients with left ventricular dysfunction scheduled for revascularization underwent GSI before and during LDD. GSI was repeated at 1 and 6 weeks after revascularization. The images were interpreted by three readers using a 17 segment model and scored (0–5, 0 = normal function and 5 = dyskinesis).

Results: 131 segments in 23 vascular territories with abnormal wall motion were examined. The function of 12 territories (66 segments) which improved with LDD had a significant improvement after revascularization, and the function of 11 territories (65 segments) which did not improve with LDD showed no significant improvement after revascularization.

Vasc. Terr. response to LDD	Wall Motion Score			Ejection Fraction		
	GSI	LDD GSI	GSI post-revasc	GSI	LDD GSI	GSI post-revasc
↑ (n = 12)	11 ± 5	4.8 ± 4*	2.9 ± 3*	39%	50%	54%
No Δ (n = 11)	12 ± 5	13 ± 6†	12 ± 9†	35%	41%	43%

* $P < 0.01$ compared with GSI; † P = NS compared with GSI

Conclusion: Tc-99m sestamibi ECG gated SPECT imaging with low dose dobutamine is a useful tool in distinguishing viable from nonviable myocardium. This method accurately predicts which territories will improve after revascularization.

1023-147 Comparison of Left Ventricular Volumes and Ejection Fraction Measured by Gated SPECT and by Cine Magnetic Resonance Imaging

Z.-X. He, G.W. Vick, III, P. Vaduganathan, M.S. Verani. *Baylor College of Medicine, Houston, TX, USA*

Left ventricular ejection fraction (LVEF) can be accurately measured by gated myocardial perfusion tomography (SPECT). There are, however, limited data validating the assessment of left ventricular volumes by gated SPECT. Accordingly, this study compared left ventricular volumes measured by gated SPECT and by cine magnetic resonance imaging (MRI) in 17 patients (13 men and 4 women, mean age 67 ± 14 years) with a recent myocardial infarction. All patients underwent rest Tc-99m tetrofosmin gated SPECT and cine MRI within 48 hours of one another. Left ventricular end-diastolic and end-systolic volumes were measured by gated SPECT using an automatic algorithm (CedarsQuantitative Gated SPECT). Left ventricular end-diastolic and end-systolic volumes were assessed by cine MRI using Simpson's rule and the LVEF was then derived from the end-diastolic and end-systolic volumes.

Good correlations between gated SPECT and cine MRI were found for LVEF ($r = 0.93$, $p < 0.0001$), end-diastolic volume ($r = 0.81$, $p < 0.0001$) and end-systolic volume ($r = 0.90$, $p < 0.0001$). Furthermore, end-diastolic volume (112 ± 23 mL vs 113 ± 29 mL, p = ns) and end-systolic volume (64 ± 38 vs 50 ± 25 mL, p = ns) by gated SPECT and cine MRI, respectively, were not significantly different.

In conclusion, this study demonstrates that not only LVEF but also left ventricular volumes can be accurately assessed by an automatic gated SPECT algorithm in a relevant cohort of post-infarction patients.

1023-148 Wall Motion Assessment by Gated SPECT Perfusion Imaging in Patients With Ischemic Cardiomyopathy

K. Galatro, J. Narula, P. Dourdoulis, J. Heo, E. Acio, S. Brozena, F. Chaudhry, A.E. Iskandrian. *Allegheny University of the Health Sciences, Philadelphia, PA, USA*

Background: The evaluation of wall motion abnormalities by gated SPECT versus echocardiography has been limited. The present study evaluated the two techniques in patients with severe LV dysfunction and a wide spectrum of wall motion abnormalities.

Methods: We examined the results of wall motion scores (WMS) in 54 patients with ischemic cardiomyopathy (LVEF <35%) who underwent dobutamine stress echocardiography (DSE) and gated SPECT imaging with Tc-99m sestamibi. The left ventricle was divided into 16 segments and scored at rest, low and peak dose dobutamine. Sestamibi was injected at peak dose and images were obtained 30–60 mins after the discontinuation of dobutamine. WMS were obtained at rest and at low dose, and then compared for both echo and gated images. A total of 860 segments were analyzed. WMS was classified as normal and abnormal; abnormal segments were further divided in mild to moderate, or severe abnormality.

Results: There was a significant agreement between echocardiographic and SPECT interpretation of normal and abnormal segments ($\kappa = 0.61$). Precise agreement of severe, mild to moderate and normal WM abnormality occurred in 63%, 51%, and 50% of segments, respectively. The agreement improved significantly for precise ± 1 WMS; severe 93%, mild to moderate 100%, normal 81% with overall agreement of 93%. Of 860 segments, 379 (44%) showed improvement at LD dobutamine by echocardiography, 309 (30%) showed improvement by gated imaging.

Conclusions: There is an acceptable correlation of wall motion between SPECT and echocardiography at rest and in response to dobutamine.